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ABSTRACT

An investigation was made of the status of the teaching of practical subjects (industrial arts) in Zambia primary schools. Lecturers and students at teachers' colleges and primary school personnel agreed to interviews and responded to questionnaires which sought to identify problems in teaching vocational subjects. Information and data were sought on the quality of practical subjects teachers, workshop facilities, and instructional materials. This report provides information on: (1) the problem of academic versus vocational education at the primary level; (2) recent writings on the implementation of practical subjects in the schools, practical subjects teachers, and practical subjects facilities and materials; (3) the design and methodology of the study; and (4) findings on the qualifications of practical subjects teachers, organization of practical subjects workshops and use of materials, and preparation of practical subjects teachers. Recommendations are made on the preparation of practical subjects teachers and improving the quality of practical subjects workshops and materials. (JD)

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African Studies
in Curriculum Development & Evaluation

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No. 82

IGNATIUS MWAMBA:

ESSENTIALS
FOR IMPLEMENTING PRACTICAL
SUBJECTS IN ZAMBIA PRIMARY
SCHOOLS.

AGO Project

GTZ, Att. Peter Sachsenmeier

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This research project was undertaken as part of a training programme jointly organized on behalf of the African Curriculum Organization (ACO) by the Kenya Institute of Education (KIE), the University of Nairobi, and the German Agency for Technical Cooperation (GTZ).

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ESSENTIALS FOR IMPLEMENTING

PRACTICAL SUBJECTS IN

ZAMBIA PRIMARY SCHOOLS

IGNATIUS NKAMBA

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ESSENTIALS FOR IMPLEMENTING PRACTICAL SUBJECTS IN ZAMBIA PRIMARY SCHOOLS

By

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D.E.S. University of Newcastle Upon Tyne 1977

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Various people have consciously or unconsciously contributed to fulfilment and success of this study.

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CHAPTER ONE

BACKGROUND AND PROBLEM ANALYSIS

Introduction:

Looking at pre-independence school curriculum, one gives a due credit to the education of the day, for giving practical subjects the right place, respect, emphasis and motivation. There was a systematic and effective planning in a sense that practical subjects were offered at primary school level. The content of the courses included woodwork, brickwork, metal work, leather work, basketry etc. Besides graduates of these programmes occupied respectable positions in society. Their status was augmented by handsome salaries which enabled them to sustain a living.

Soon after independence, serious mistake was made, a disappearance of practical subjects from the school curriculum. Lecturers and teachers in schools and colleges were redrafted to take academic teaching subjects or become building officers within the Ministry of Education at provincial or district level. This was deliberate attempt to abolish what seemed an inferior field of education. Workshops were renovated into ordinary classrooms, and tools and equipment were redistributed to trades schools and Ministry regional headquarters maintenance workshops. The situation became so bad that even manual work, production units were dispised and discouraged.

Now that the mistake has been identified, the correction must begin. All primary schools have received tool sets to be used in all areas of practical subjects supplied by the Republic of Finland through the development cooperation programme.

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But the implementation of practical subjects in schools has many problems such as lack of workshops facilities, teachers and materials, although practical subjects curriculum has been designed and developed. The Ministry of Education and Culture should design methods of implementing practical subjects to overcome the present constraints.

Description of the Problem

The concept of linking education and practical subjects as a way of revitalizing formal education and providing pupils with a preparation for life of work prompted the reintroduction of practical subjects in primary schools in Zambia. This decision came about, after many people were dissatisfied about hhe numerous school leavers who could not fit into their communities nor get any gainful occupation. This situation led to the condemnation of the imported education which did not reflect the needs of the society. The need to change certain aspects of education was felt, which resulted into the most urgent problem of teaching manual skills in primary schools.

The philosophy of Humanism, which is the guiding principle of Zambia's development and which puts man in the centre of every activity in society, reinforced the need for including practical skills on the school programme, so that each pupil within the limits of his capacity will obtain intellectual excellence and acquire basic practical skills. It is only through this way that the individual will contribute to the social and economic development. The rationale for establishment of practial subjects education lies in antiquity, man has always been concerned with work of an industrial nature and means of preparing for it. From his primitive experiments with stone tools to his marvels of technical automation, man has involved himself with a never ending search for better ways of doing and making things for the means of transmitting his skills and knowledge (Feirer and Lindbeck, 1963).

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While the government encourages the teaching of practical subjects in schools, the main objective is not to prepare pupils for industrial occupation. Through practical subjects pupils study tools, materials, products and occupation of industry as pursued for general education purposes. Unfortunately the situation is not so in schools, because practical subjects implementation has not been successful, due to three main problems namely low quality of teachers teaching practical subjects, primary schools have no workshop facilities and schools are not supplied with materials to be used when teaching practical skills.

The problem of qualified teachers is due to insufficient teacher preparation both at pre-service training and in-service training. Teachers lack a broad understanding of technology of the subjects areas, they have no ability to use common tools correctly and lack a sound pedagogical training directly to practical subjects. The teachers do not master all the techniques of teaching practicals skills because they are not trained as specialist teachers, and because most primary teachers' colleges are not adequately staffed with technically qualified, high and manpowered lecturers to train teachers.

Where practical subjects teachers have been adequately trained, Olson (I963) speaks of them as chief resource person for pupils. He says it is not the specific method the teacher uses but also the degree of support the gives the pupils in the pursuit of relevant practical skills and interest. Naturally the practical subjects teacher should be competent in science and technology. He is more scientist than trades man, more creator than machine operator. But as chief resource person, he is not expected to have all of the answers to pupils questions. He should know how to go about seeking about answers and where they may be found. He should be the gifted generalist not jack of all trades (Olson). The teacher has a pedagogic proficiency, enabling him to secure, identify and assess growth and development in his pupils as an individual along with the techniques of manipulating tools and materials. The practical subjects teacher should realize that if he will develop creativity,

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he must teach creatively. Consequently, he, himself, is ever searching for the better way in his methodology. He will maintain a resource mind, ever stimulating, expediting, and raising the level of thinking by his pupils and in doing so, he will himself experience a continuing growth.

There are three types of teachers who are involved in teaching practical subjects. The first group is the newly trained teachers, who study practical subjects as part of the teacher education curriculum for primary schools. The second group of teachers is that of classroom teachers who are selected to undergo an inservice course in practical subjects so that when they complete the course, they will go back to their schools and teach children how to use tools. This training is not enough to enable one to teach specialist subjects without adequate specialist course. The third group is that of teachers who were redrafted to teach academic subjects when the government faced out the teaching of woodwork, brickwork, and other related crafts from the school curriculum soon after independence. These teachers originally were instructors or handicraft teachers, but they could not cope up with modern methods of teaching elementary technology. Secondly these teachers although requested to teach practical skills, they have lost interest because there are no incentives in teaching practical subjects since they are inferiort to other subjects in primary schools.

Considering the prevailing situation in schools in as far as the teaching of practical subjects is concerned one may be forced to conclude that colleges and their practical subjects curriculum are remote from the realities of schools. Information about real conditions and real problems appear incomplete. Student-teachers are prepared for what should be, rather than what it is. There seems to have little conscious attempt to base the curriculum or its priorities on the task which teachers should undertake in schools. There is also a strong opinion by many people, that there is also the possibility that within the colleges, the actual curriculum and the actual practice may indeed prove even less relevant to the needs of schools because qualifications and experience of practical subjects lecturers in teacher training colleges often

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leave much to be desired largely because rewards and living conditions are unattractive but also because it proves very difficult to find the needed staff with suitable professional and academic qualifications on the one hand and experience of primary schools on the other.

Put along one another, all these shortcomings add up to a strong indictment of the present system of preparing practical subjects teachers. One obvious remedy is the training of specialist teachers fin practical subjects in the same manner the Industrial Arts teachers are trained for secondary schools.

The implementation of practical subjects and the continuation of the new approaches in practical skills depend not only on the adequate teacher preparation but also on practical subjects workshop facilities. Almost all primary schools in Zambia have no workshops where practical skills in woodwork, metalwork, building craft and light crafts could be taught. Only in very few schools where make-shift or improvised shelter have been built, allowing children to learn rudiment skills in traditional crafts. This is a dilemma which is frustrating many teachers who have not only interest but the technical skills in practical subjects. Since schools do not have workshop facilities pupils are deprived of the chance to learn basic skills through practical work throughout the primary course. However, to remedy the situation since tools and cabinets have been provided to every primary school, the Ministry of Education and Culture has been encouraging the schools and the community the schools serve to construct workshops in the similar manrer they construct classroom blocks on self-help basis, while the government assist in providing the necessary personnel who are experts in building construction, in order to build the recommended workshop.

School buildings are essentially an inter-disciplinary exercise, to an architectural response to an educational requirements. It is required to promote an environment of learning experience. Practical skills in the content of the discussion is not just the requirement of basic skills in woodwork, metal work etc. but a means of imparting creativity, the power of analysis and skill

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application. Hence the practical subjects workshop should be the nerve centre of educational activity. This is the concept with which we must commence. Accommodating large numbers of pupils for a full range of activities is a big problem involving considerations of space, facilities and equipment, services, noises, cleanliness and storage. The workshop should be well lighted and air conditioned to promote safety precautious.

Feirer and Lindbeck (1964) writing on the facilities for elementary schools suggest that, there is no standard physical facilities for practical subjects programmes. The setlup rather vary with instructional staff and the administration. Nevertheless it is possible, to identify typical settings in which such programmes are carried on.

There may be centrally located activity rooms, which practical subjects teachers use as occasions arise. Such rooms contain workbenches, tools, equipment, materials and storage lockers designed to be used by pupils. The room should contain everything necessary to offer broad manipulative planning experiences to enrich learning. One of the drawbacks to such a room is the necessity for scheduling its use in advance. It is important that the physical facilities for practical subjects can only be planned with a full knowledge and understanding of the nature of the curriculum, unless one knows what woodwork activities are to be included in the course he cannot properly select the machinery, the tools or necessary space to carry out these activities. In a school with very definite pre-vocational converns there must be available to pupils facilities for work and study. By tradition facilities are planned for twenty-four pupils. There is nothing sacred in this number. This number might be smaller depending on the experience of instructional staff.

Spaces on which to work is very vital in practical subjects. The idea is to provide a permanent activitity area in the workshop. Ample tools, supplies, materials and working benches are provided.

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The convenience of this set up is that the teacher always has the facilities available for use and pupils have each sufficient space on the workbenches without overcroding, and tools are neatly placed where sufficient space is provided, the plan offers flexibility in instruction by making possible a multiple-activity programme, some pupils may be busy preparing materials on the benches, while others may be studying that materials use in construction with the teacher. When such facilities are absent, such as like in the make shift multiple activity programme is not possible and both the teacher and pupils operate under difficult conditions.

The tools and equipment should be of high quality and of a size and weight suitable for pupils to use easily and safely. Proper instruction in the use of tools must precede their employment by the pupils. Further, the tools must be maintained in order to ensure good instruction and good learning, the sharp, well cared for tool is safe, easy and fun to use and pupils will be happy with the fruits of their labour. Working with a dull, broken tool is not only frustrating, it is also dangerous and makes learning very poor.

Efficiency involves securing a realistic allocation of funds to buy materials such as timber, metal sheets, glue, metal bars, wire, etc, persuading those who have recommended the teaching of practical subjects to bear the realities of implementation in mind and ensuring that most of the materials are available for the least money. Since the introduction of practical subjects education in primary schools no funds have ever been provided to purchase materials to use in teaching practical skills. This is one of the most serious problems affecting the full implementation of practical subjects. Although tools are found in schools, they are not utilised at all. But in order to alleviate the situation teachers have been advised to use any materials the environment might provide. Schools are expected to improvise the materials to be used in teaching practical skills. Many teachers though willing to teach could not cope up hunting for materials in order to teach any skills in woodwork or metal work. Schools in rural areas where would they get materials for metal work at schools, in urban areas where would the get wood or timber to be used in wood-work. This is one of the earthbreaks, and teachers do whatever they like during practical subjects periods.

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Choices are painful. The Ministry of Education and Culture or the Government in general has no money to purchase any materials. Prices of materials have risen dramatically, government subsides have not kept pace with it. However most environments in Zambia are rich resources of different types of materials for practical subjects. Schools in urban areas have their own possibilities. Junk or scrap yards or even the local rubbish pit, can provide strange and exciting finds. Schools in rural areas are surrounded by environments with natural materials such as wood, sisal, bamboo, hones, hides, clay etc, What is needed is a positive and imaginative attitude on the part of the teacher which will fire children to collect all sorts of materials.

Although the environment can offer different types of materials, the problem is still there. It is likely that the teacher will still need to provide supplementary materials which he needs to purchase such as glue, nails, screws etc. It should be realized, that the problems arise mostly from the need to join one mateiral to the other rather than cutting or shaping, and these problems are usually without traditionally ready-made solutions. This is an important aspect of the work and one which develops in children the capacity to improvise and to develop their own techniques than to rely on adult know how.

Where materials in practical subjects are not provided it is difficult to follow a systematic programme which has been designed or developed. It is unfortunate that such a situation exists. What children in primary schools largely depends on the teachers' own resourcefulness and initiatives in exploring the environment which contains all certain skills by producing objects which have utility. The teacher is also prompted by popular demands and expectations of the government and parents without adequate professional guidance.

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Purpose of the Study

It is the purpose of this study to do the following.

(i) to do a survey in some primary teachers colleges and primary schools in order to find out the current practices and situations in teaching practical subjects,

(ii) to identify the areas of problems.

(iii) to explore the causes of the problems,

(iv) to compare these findings with professional theories on practical subjects as advance in the literature review,

(v) on the basis of these findings to suggest a possible programme of practical subjects implementation in Zambia primary schools.

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Significance of the Study

The Curriculum Development Centre is naturally interested in the early programme of practical subjects studies, which is a vital stage of introducing children to elements of technology in formal primary education, which it is already developing and continually seeking to improve. In the absence of systematic implementation this does not favour good educational benefits for children before leaving the Zambia Primary Course. The Curriculum Development Centre strongly feels that a systematic implementation of practical subjects ought to be designed and carried out adequately, but it does not have enough information about the current programmes and practices in primary schools, which should be considered while designing and developing the required curriculum. It is the researchers' hope that the findings of this study will be the starting point on which the Curriculum Development Centre can base its further efforts to develop and implement a more comprehensive practical subjects studies for primary schools. The findings will also help concerned ministry of education officials to be conscious about the problem and furnish possible solutions.

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Definition of Terms

Practical Subjects: What is referred to as practical subjects in this study is woodwork, metal work, building craft and light crafts which are encorporated into one subject area at primary level.

Makeshift: This is used as a synonym of temporary workshop or shelter.

Worshop facilities: Workshop facilities is a reference to physical facilities for practical subjects in terms of space allocation, tools, benches, and special equipment which are planned with the course objectives for work and study which should be available to every pupil.

Practical Skills: This is a reference to all techniques acquired in learning activities by manipulating tools and materials in order to make things which have utility.

Hypothesis of this Study

The hypothesis of this study is that practical subjects education in Zambia is not as effective as it ought to be in developing basic practical skills and offer productive experiences. This assumption is based on the absence of systematic curriculum implementation which has been professionally developed.

It is therefore expected that the findings of the study will reveal, among other things, the following

(i) low teacher effectiveness due to inadequate professional training and guidance.

(ii) lack of workshop facilities hinders the application of teaching and learning strategies.

(iii) not enough practical skills activities are explored due to non availability of materials.

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LITERATURE REVIEW

IMPLEMENTATION OF PRACTICAL SUBJECTS

African countries after years of independence have generally come to the conclusion that classical education modelled around imported patterns is neither relevant nor does it answer to their needs for cultural and socio-economic development. Zambia being no exception has taken the step to reform the educational system providing for a basic education oriented towards the preparation of its youth for life of work and to ensure the quality of access to education for all. The Government has made an attempt to deal with most urgent problems of introducing practical skills (manual skills) in our school curriculum. Thus it was decided that pupils in their last three years of primary education should receive training in agriculture, woodwork, metal work and other practical skills. It was decided to equip primary schools with tool sets, workshops, school gardens and to explore the possibilities of involvement of the communities in the construction of their building using local available materials. At secondary level, all Schools have been equipped with modern workshops with modern equipment where our youth continue learning practical skills.

In 1974 the General Conference of Unesco made the following observations.

> Countries undertaking the enormous task of restructuring, reorienting and expanding their educational systems to meet development needs are devoting more and more attention to the role of technical and vocational education. Indeed, political leaders, economic planners and educators in many countries appear to consider the development of technical and vocational education as the keystone of an educational system best adapted to the individual and the society in which he or she lives. In recent years, progress has been made not only in expanding technical and vocational education to meet skilled manpower needs but also in terms of broad reform directed at making education as a whole more responsive to social and economic development requirements. Countries engaged in this process are thus seeking the means by which obstacles to progress may be rapidly and effectively removed.

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The school should devise definite skills training programmes in a variety of field of occupational activities in order that each school-leaver, who may not be immediately proceeding with full-time education, will have the opportunity to choose from any of such programmes.

The variety of such practical skills could include metal work, woodwork, beadwork, leatherwork, basketry, claywork, tailoring, embroidery sewing, pig and poultry production, farming and other agricultural skills, general repairs of electrical appliance, shoe repairs, automotive services and maintenance etc. These are only few examples from agricultural production, crafts and general servicing.

In pursuing these practical skills, the graduates will no doubt be able to draw upon the experience or skills they may have acquired in the course of their basic education. The practical skills should be acquired by every school leaver if education for self-reliance is to be meaningful (educational reform pages I8 and I9). The Education Reform I977 stresses among other things:-

> Education for development. Yet the word DEVELOPMENT has many facets: social development, political development, cultural development, economic development etc. In the cultural and economic terms, one of the priority areas of development is the promotion of production and practical skills.

The need to involve a curriculum which is capable of giving a basic education pupil the practical skills or self reliance skills he requires in order to face his world of adulthood with confidence and productive life. The reform document, however, emphasizes the fact that these practical skillsshould not be expected to make a person employable but rather enable him to subsist through self-reliance ventures. "1981 practical subject Report says";

> Practical subjects education is usually offered on the upper primary level (i.e. grade V, VI and VII) which is an integral part of the general primary education programme. The studies are designed to introduce pupils to the elements of technology to develop basic practical

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skills and to offer productive experience in the manipulation of tools and materials. Practicsl subjects education is offered for exploratory and guidance purposes rather than to prepare pupils for specific occupation. On one hand it is intended to accuaint all school children with the world of technology and its relation to contemporary life as a whole. On the other hand, it may serve to guide those with the interest and ability into technical and vocational education proper. Thus practical subjects education serves to enlarge the general basic education for all pupils: to orient some towards further technical and vocational education, and in addition to provide early school leavers with some rudiments of technological understanding which will enable them to be more easily trained on the job. Problem of technological development is often phrased in terms of search for appropriate technology; by which people gain confidence and the capacity to innovate, create and adapt new technology to their needs at grass-roots levels. The skills should facilitate the individual's mistery of technical skills which they may apply to daily life.

Writing about the purpose of implementing industrial arts to junior schools Feirer and Lindbeck (pp 20-2I) made the following observations.

For the elementary grades, industrial arts consists primarily of activities which involve constructive endeavour with material objects. These construction activities, coupled with experiences of related nature, lend themselves to acquainting young people with the industrial arts which work toward the realization of this goal. First, the programme involves manipulative and related experiences which enhance the broad units of learning in the elementary school. Second, it provides an excellent vehicle for creative expression in a great variety of materials. Such activity is realistic and practical; it requires that the pupils use things, do things, and make things. The rationale for such experiential programmes lies with the child's natural desire to explore and work in the world around him. He wants to touch to taste, to build, and to try to do, he would prefer to be a participant rather than a spectator in his learning environment.

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Practical subjects activities can contribute to the total effectiveness of education at this level in many different ways. They can, for example, enrich the curriculum by making learning easier and more ineteresting. They also reduce the level of abstraction by making facts and concepts less difficult to understand. The arithmetic concepts of halves, thirds and fourths may be simplified by making and using woodern or metal models which illustrate these concepts. In addition to this matter of clarification, it is difficult to deny that children are more motivated to learn when learning involves not only the auditory sense but the visual, tactile, and kinesthetic senses as well. The well panned practical subjects actively requires an intimate teacher - pupil-subject association which brings these several senses actively into play. Mention also must be made of contributions to social value and attitude formation. The nature of construction activity requires cooperation, sharing and responsibility. Instead of creating artificial situations in which to teach these desired attitudes, teachers might well take an advantage of industrial activities. In the report of the Zambia-Finnish Evaluation team on the teaching of practical subjects project in I978 a research study found out that although many changes were made, however, created a new set of problems for the education system. The rate of expansion at the secondary school level for instance did not keep pace with the massive expansion at the primary level. The result was a vast number of early school leavers who did not have a satisfactory preparation for Adult life. Whereas the previous development plans had emphasized quantitative aspects of educational development, the second national development plan (I972-76) concentrated on both qualitative and quantitative aspects. In the forword of the SNDP President Kaunda states: "In the field of education we plan to concentrate on the production of skills - as against general education". In the section of the SNDP dealing with the primary school curriculum it is said that "A curriculum must change in order to remain useful, and the objectives of the primary school curriculum must now be interpreted in the light of the fact that, for many years to come, most children will receive no more than seven years of full-time schooling. Few of these young people will enter wage jobs or further training. The primary school must, therefore, help children to prepare themselves for a productive life in their communities, whether rural or urban.

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It should foster children's self-confidence and self-reliance, by arousing educational interests and teaching practical skills, and by helping to make intelligible the social and economic changes which their communities are undergoing.

Many educationist who have worked for long on early childhood education tend to agree on the general implementation of elementary technology to primary school children. Feifer and Lindbeck (I964) state that the implementation of practical subjects offer a wide range of activities to enable the youth to develop a clearer understanding of industrial materials, and processes and explore individual aptitudes and aspirations. Its mission then is two-fold: it introduces pupils to the world of industry and technology and it guides them in terms of vocational interest and abilities. Out of these experiences pupils develop a feeling of confidence in themselves and in their world. Pupils are free to search, and are responsible for a continuing search for a better way. Technolodge selection and development are primarily pupils responsibility. But project selection is not left to pupils alone or left to its development to trial and error. (Olson and Watson. I960).

For the unskilful teacher it may appear an impossible task to expose pupils to elementary technology in such a wide of areas such as building craft light crafts (basketry, bamboo work, horn work etc) metal work and woodwork. Metalwork or buildingcraft, for instance, may be considered impossible to teach to young people and probably be recommended for senior classes. However, current learning theories support the introduction of elementary technology and other practical skills at an early age provided that they are introduced in a manner intelligible and learnable to that age. Contributions to the Total Education Programme Feirer and Lindbeck (I964, PP I5-I6) summarised the major reasons for introducing practical subjects at an early stage. These are

I. To develop in each pupil and insight and understanding of industry and its place in our culture;

2. To discover and develop talent of pupils in the technical fields and applied science;

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3. To develop in each pupil a measure of skills in the use of common tools and machines.

Practical subjects contribute, in terms of the above objectives to educational programme at all levels of instruction, from the primary grades to adult enrichment offerings. Its content is derived from industry and from the very nature of modern technological society, and its objectives derive in turn, from this content.

PRACTICAL SUBJECTS TEACHER

Feirer and Lindbeck (1964) speak of the teacher as the key factor in any sound implementation of practical subjects. Regardless of the high quality of administrative and supervisory leadership, of curriculum the course of instruction will suffer if it is in the hands of a person other than a competent teacher.. The Zambian Finnish Evaluation Report (1981) caution that quick results could not be expected in the implementation of practical subjects because of the weakness of the resources at the starting point in respect of man power, tools workshops, materials and also because of still prevailing conservative attitudes towards practical work as part of the school curriculum. The Annual Report on Practical subjects C.D.C. (1981) recommends that only experienced practical subjects teachers should be allowed to teach practical skills. This is very important because teachers with technical craft are capable of demonstrating modern methods of teaching technology, and maintenance of tools and workshop management.

Olson (1963) gives some reflection on the role and expectations of the industrial arts teacher. He states that:

The teacher is resource person for the pupils. He is competent in science and technology. He is more scientist than tradesman, more craftsman than a machine operator. But as chief resource person, he is not expected to have all of the answers to pupils questions. Rather, he knows how to go about seeking out answers and where they may be found. The teacher has pedagogic proficiency enabling him to secure, identify and assess growth and development in pupils.

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The teacher should realize that if he will develop creativity, he must teach creatively. Consequently, he himself is ever searching for better way in his methodology. He will maintain a resourceful mind, ever stimulating and raising the levels of thinking by his pupils.

In view of the definition and description of the practical subjects teacher as facet of general education in primary schools, it is possible to isolate some basic considerations relative to the preparation of teachers. Feirer and Lindbeck (I964) made the following assumption.

The practical subjects teacher must possess competencies in the areas of general eudcation, and technical studies. The rationale for the acquisition of these competencies lies with the contention that he must have a grasp of basic educational studies in term of communication skills, the humanities and the sciences.

In this state of affairs it can be that teacher preparation in practical subjects is very crucial. At the ACO Workshop on Teacher Education held in Lusaka November-December I980, stressed that the success of any teaching and learning programme all levels depend on the commitment, competence and resourcefulness of the teachers. To be an effective teacher practictioner one should have among other things: mastery of the subject; some knowledge of educational technology: an appreciation of psychological process of learning and a sense of professionalism.

While supporting the ACO workshop recommendations there should be caution to ensure that learning activities should not undermine pupils creativity during designing and contruction of items. This can be achieved by directing most of the learning through exposure to all materials, skills and facilities the environment may provide. Glenister (I960) states that the specialised nature of the teacher education depends on specialised facilities for effective operation. The prospective facilities give him a much deeper and broader understanding of technologhy and allow him to do some research as a means of personal development.

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FACILITIES FOR PRACTICAL SUBJECTS

In a school with very definite prevocational concern there must be available to the pupils facilities for work and study which represent as much as possible the industrial work environment. Gleinster (I960) made the following observations.

> By tradition, industrial arts facilities are generally planned for twenty-four pupils. There is nothing particular sacred in number, and in some cases this restrictive decision may appear arbitrary. It should be remembered, however, that the nature of the programme for a primary school, as well as the experiences of the staff can raise or lower this figure.

In Zambian situation there is a great deal of flexibility in sound practical subjects programme which will permit the implementation of changes commensurate with the need. In an upper grade the programme may well dictate a class size of only fifteen in order to allow the teachers to give the specialised attention so necessary.

Space allocations and layouts vary from workshop to workshop. Feirer and Lindbeck (I964) numerated guides to workshop planning and organisation for schools, some of which are as fellows.

- Workshops should be single-story
- The site devoted to workshops should be large enough to provide for future expansion
- Workshop should be located so that the noise will not disturb other school activities.
- Clear floor space should be provided in front for tool panels
- Workbenches should be of standard size with lockers beneath
- Storage facilities should be available
- Adequate washup should be provided
- Fire extinguishers are required and workshop service equipment must be located conviniently and labelled clearly ...

The state of affairs prevailing in Zambia and elsewhere workshop facilities are not available in primary schools. At a time when practical subjects are being implemented in every school, it is becoming extremely difficult to find adequate workshop facilities. Moreover even those teachers who have been trained in teaching practical subjects could not teach because facilities do not exist. As parents are increasing showing favour for practical skills orienation in primary schools, workshops should be constructed to cope with the popular demand and expectation. This view is supported by the Zambian-Finnish Evaluation Report I978 which recommended that:

> workshops at primary school should be built in coordination with allocation of qualified teachers and educational tools and equipment self-help activity and production unit work can offer here a useful way to have workshops provided economically and by mass participation of local community to development.

As stated in the Educational Reform Document (I977) education is production work is strongly emphasised in the reform. This decision gives very strong impetus and encouragement to the teaching of practical subjects in all educational institution. In any case workshop provision undoubtedly costs money, such facilities for the purpose envisaged in this situation should not demand unduly high expanditure. The workshop should be simple adapted for teaching purposes.

PRACTICAL SUBJECTS MATERIALS

While it is desirable to teach practical skills in woodwork. metalwork etc. the teacher is always faced with the problem of materials to use in order to teach practical skills. This is a dilemma, since the Ministry of General Education and Culture does allocate funds in order schools to purchase the necessary materials. However in order to overcome the above problem Deem (1963) mmade the following observations.

> Most environment are rich sources of different types of meteriels for practical subjects schools in urban areas have their

own possibilities. Waste or scrap yards or even the rubbish tip, can provide strange and exciting finds. Schools in rural areas are surrounded by environment with natural materials such as wood, bamboo sisal, horns, hides etc. What is needed is a positive and imaginative attitude on the part of the teacher which will fire the children to all sorts of materials.

The Annual Report on Practical Subjects Project (I98I) C.D.C. recommended that, although different materials will be provided by the environment, it is most likely that the school authority need to provide funds to be used in purchasing supplementary materials such as nails, screws, strings, wires, planks, off-cuts of wood, metal, adhesives etc. The Education Reform Document (I977) recommends that all Schools should create production unit. It is through the production unit that funds will be generated which will be used to purchase supplementary materials for practical subjects.

The entire programme of practical subjects implementation in Zambia should be designed to encompass a wide variety of introductory experiences with the basic tools, materials and processes of industry. A complete programme should provide for basic instruction in the areas of working with wood, metal, bamboo, fibre pastics, grass, clay, hides horns and bones.

It is therefore important for the teacher to be aware of what the materials can offer and to structure the pupils' activities to give them what they need in the way of formative experience. For example, where the work takes place will largely determine the scale of what is being made, irrespective of what the materials available might offer in the way acquiring practical skills.

CHAPTER THREE

DESIGN AND METHODOLOGY

This research study took place during the month of May and June, I983. The study instrument employed were observations, interviews and questionnaire. Observations and interviews were personally. The questionnaires were aimed at eleciting information and data on the practical subjects teacher quality, workshop facilities and instructional media. Some personal interviews were carried out with teacher trainers, students in colleges and primary school teachers in the country. However, with limited funds available and time for the study it became necessary to limit its scope to few primary teachers' colleges and few primary schools. Moreover, for the same reason, only colleges and primary schools which were in urban sectors were chosen for their proximity to the researcher's place of work. Proper records showing the exact number of schools teaching practical subjects, vary, according to the Practical Subjects Project report I978. A number of schools start teaching practical subjects and eventually stop because either practical subjects teachers cannot be found, or teachers quit the job or workshop facilities and materials to use were not available.

It became necessary from the start to determine how many schools and colleges should be covered for the study. At the beginning a total of thirty six and eleven primary teachers' colleges looked reasonable, but after the pilot study it became evident that only twenty and four primary teachers' colleges. It is necessary, too, to identify the colleges and primary schools by their organising agencies. The rationale for this, is to see whether the organising agencies made any differences in the matters related to workshop facilities, supply of materials, tools and equipment, and teacher employment. The interest here is on teacher quality and workshop facilities which have a direct bearing on effectiveness of teaching practical skills and overall management.

Stratified random samples were obtained from various colleges and schools as follows: two colleges run by the church organizations, two colleges run by the government two demonstration schools and two primary schools from the rural areas in each of the five regions.

The selection of respondents was based on involving the teaching personnel who encounter immediate problems. Teachers are the most important curriculum implementers in teaching and learning. The problem of teaching and learning is about teachers and their pupils in schools.

Information on the administration supply of tools,, equipment and materials financial constraints and mobility of practical subjects teachers were elicited from the Inspectors of schools and District Education Officers.

Instrumentation

To gather the required data this survey used observations, interviews and questionnaire as will be elaborated below.

(i) Observation Guide

This was used in colleges and primary schools to gather information about various aspects of practical subjects teaching. The use of the observation method was more appropriate in producing a kind of data which the other two methods (i.e. interview and questionnaire), could not b because the raw material observation was reality itself.

The observation guide focussed on the following

- teacher functioning,
- pupils' work
- production units
- workshop facilities (building, benches, space, safety and storage)
- materials (formal and informal)

(ii) Interview Schedules

The interview schedules was used to gather information from teachers teaching practical subjects, practical subjects lecturers and students. The interview sought information about the following:-

- What teachers need most for the practical subjects department
- what they consider to be the most important things pupils should learn at school

- their training needs
- what they think parents would with their children to learn from practical subjects
- their pressing problems which inhibit the successful traching of practical subjects.

Interviews with college lecturers sought ideas about expectations of practical subjects education.

- what they needed most in preparing student teachers in practical subjects
- what they considered to be most important for student teachers to master in teachig practical subjects skills
- their views on staffing
- integration of practical subjects with related subjects

Interviews with student sought information about the course content of the training programme

- what they thought about the importance of practicsl subjects
- the main areas of practical subjects
- organization of practical subjects
- teaching practic facilities
- student lecturer interaction
- involvement in practical subjects projects.

(iii) Questionnaire

Questionnaire was designed to gather information from Curriculum developer, inspectors and resource teachers. This will consist of a few closed and open-ended items.

Data Collection

The various data was collected as follows:-

(i) Direct Observations:

This was the main method of collecting data. The researcher spent a day or two in each college or primary school observing all aspects of practical subjects programme.

(ii) Interviews

These were used to supplement data which could not be readily observable. All interviews were conducted with teachers in-charge of practical subjects,, college practical subjects lecturers and student teachers. Student teachers were interviewed about their expectations in implementing practical subjects in schools and their involvement in acquiring mastery in teaching practical skills.

(iii) Questionnaires:

Only one questionnaire was used, which was served to curriculum developer at the National Curriculum Development Centre, Inspectors and resource teachers. It sought their ideas about the implementation of practical subjects in primary schools and primary teachers' colleges by asking them to agree or disagree with suggested statements which reflected teacher competence in teaching practical skills, workshop facilities and materials in general. It also sought their ideas about methodology and organization of practical subjects education. The questionnaire was intended to be administered to all inspectors, curriculum developers and resource teachers, but as many of these officers were deployed in the national duty of voters' regislation throughout the country, it was served to only to 40, which is about 60% of the total.

Data Analysis

Because of the difficulties of quantifying results obtained from interviews or open ended questionnaires, the analysis of the data thus obtained was done by adding up frequencies of recurrent responses and by comparing or contrasting such frequencies as the need might be. In many cases the analysis was done by working percentages of responses.

Limitation of the Study

(i) Time constraint was the major limiting factor.

(ii) As a corollary to (i) the information gathered from the survey may not be adequate as only one or two days were spent in each college or school. It was not possible to observe a full programme to get a complete picture.

(iii) Transport was a problem to the researcher to reach the required institutions and schools.

(iv) Funds were a problem in that stationary was very expensive.

(v) The use of interviews and a largely open-ended questionnaire posed much difficult in quantifying data for analysis purposes.

CHAPTER FOUR

RESEARCH FINDINGS

The following account is the summary of the findings obtained from this day

1. Practical Subjects

Curriculum developers, inspectors and resource teachers respondents were required to suggest which subject area conveys the actual meaning of practical subjects (woodwork, metalwork, building craft and light crafts) among the following subjects titles.

1. Creative Activities
2. Art and Crafts
3. Industrial Arts
4. Handicrafts western
5. Technical Crafts
6. Home crafts
7. Fine Arts

An examination of suggested subject titles, the results indicate a general agreement as shown in the table below

TABLE 1

SUBJECT TITLES	RESPONDENTS
Creative Activities	10 (25%)
Art and Crafts	15 (37.5%)
Industrial Arts	16 (40%)
Handicrafts	18 (45%)
Technical Crafts	(20%)
Homecrafts	(22.5%)
Fine Arts	(12.5%)

As indicated in table one most curriculum developer, inspectors and resource teachers suggested Handicrafts (45%) to be the appropriate subject title for practical subjects or Industrial Arts (40%). Others indicated art and crafts (37.5%).

2. Type of teachers to implement practical subjects in primary schools

Curriculum developers inspectors and resource teachers respondents were asked to suggest the type of a teacher suitable to teach practical subjects in primary school by expressing agreement or disagreement. The results are shown in the table below.

TABLE 2

CURRICULUM DEVELOPER, INSPECTORS AND RESOURCE TEACHERS RATING THE DIFFERENT TYPES OF TEACHERS

	N = 40				
Statement	very much agree %	Agree %	don't know %	disa-agree %	very much disagree %
Practical subjects in Primary Schools need specialist teachers	45.0	15.0	0	5.0	5.0
Teachers with basic practical skills should be made to be in charge of practical subjects	62.5	5.0	0	7.5	0
Only the tradesmen should be employed to teach practical subjects in primary schools	5.0	5.0	0	37.5	40.0
The industrial art skills belong to the secondary school teachers	5.0	5.0	0	50.0	15.0

The Primary School practical subjects teacher should be capable of demonstrating industrial skills	40.0	25.0	2.5	10.0	5.0
Practical subjects teachers should be maintenance teachers	27.5	30.0	0	25.0	7.5
Only the industrial art teachers should be allowed to teach practical subjects in priary school	2.5	5.0	0	50.0	17.5
The practical subjects teacher should not teach any other subject apart from practical subjects	32.5	12.5	0	15.0	12.5
Village traditional craftmen should be involved in teaching practical subjects in primary schools	65.0	7.5	0	5.0	0
Any Primary School teacher can teach practical skills	5.0	5.0	2.5	25.0	37.5
The headteacher should be the only officer to be in charge of practical subjects	0	0	0	17.5	50.0

Practical subjects is the only subject without any general contribution to the School Community	0	0	0	20.0	60.0
Traditional crafts men do know the techniques of practical subjects	37.5	25.0	0	5.0	30.0

The data presented in table 2 illustrate that 60% of the respondents suggest that practical subjects in primary schools should be taught by specialist teachers with practical skills. The curriculum developers, inspectors and resource teachers respondents with 62.5 indicate that the teacher with basic practical skills should be responsible for practical subjects tools and equipment; 40% indicate that these teachers should be capable of demonstrating industrial skills. The respondents 40% show that trades men are not supposed to be teaching practical skills in primary schools because they are not trained in teaching methods. One interesting funding in the data presented in table two is that 65% of the respondents indicate the involvement of traditional craftmen in the teaching of practical skills to promote cultural traditional crafts side by side with modern technology.

3. Workshop facilities

Curriculum developers, inspectors and resource teachers respondents were asked to rate the importance of the various workshop facilities which are found in the institutions and schools. The results are shown in the table below

TABLE 3

CURRICULUM DEVELOPER, INSPECTORS/RESOURCE TEACHERS RATING OF THE VARIOUS WORKSHOP FACILITIES

Facilities	N = 40				
	Extremely important %	Very important %	Important %	Uncertain %	Not important %
Workshop, makeshift	80.0	50.0	2.5	0	5
Tools and equipment	75.0	50.0	0	0	0
Separate store rooms	27.5	30.0	5.0	0	2.5
Maintaing adequate supply of materials	57.5	10.0	10.0	0	0
Keep an up to date inventory	50.0	15.0	5.0	0	0
Eliminating excessive materials	17.5	7.5	17.5	2.5	5.0
Keeping the workshop attractive	57.5	17.5	5.0	2.5	2.5
Possibilities of improvising tools	50.0	20.0	5.0	0	0
Maintaning visual display	30.0	22.5	12.5	0	0

The data presented in table 3 illustrate that curriculum developers inspectors and resource teachers fully recommend the provision of workshop facilities in primary schools in order to implement practical subjects. As indicated in the above table (3) 80% of the respondents have recommended the construction of workshops or makeshifts; 75% supply of tools and equipment, 57% maintaning

adequate supply of materials; 50% keeping an up to date inventory; 57% respondents have recommended keeping the workshop attractive. Responding to other questions, the Curriculum developers, inspectors and resource teachers, recommended the construction of seperate store rooms 57.5%, and possibilities of improvising tools 70%. According to the data 52% respondents indicated the maintenance of the visual display and 17.5% rejected the elimination of excessive materials.

4. Content of practical subjects

The curriculum developers inspectors and resource teachers were asked to indicate the relevance of the practical subjects curriculum. The respondents recommended the following activities as shown in table 4 according to their usefulness.

TABLE 4

CURRICULUM DEVELOPERS, INSPECTORS AND RESOURCE TEACHERS RATING THE RELEVANCE OF PRACTICAL SUBJECTS CONTENT

	NO. 40				
Learning activities	Extremely useful %	Very useful %	Useful %	Uncertain %	not useful %
Bamboo work	60.0	25.0	30.0	0	0
Bonework	15.0	20.0	25.0	0	2.0
Brushwork	50.0	25.0	22.5	0	0
Building craft	37.5	20	12.5	0	0
Hornwork	65.0	17.5	25.0	2.5	0
Leatherwork	45.0	20.0	5.0	2.5	0
metalwork	57.5	15.0	7.5	0	0

Repair and Maintenance	50.0	17.5	2.5	0	0
Sculpture	32.5	27.5	22.5	0	0
Woodwork	75.5	12.5	2.5	0	0

To determine which of these activities were considered to be useful in practical subjects content all activities were checked in an extremely useful, very useful and useful were considered as recommended for inclusion while those which were checked in as uncertain or not useful all were considered as rejected or not recommended. According to the data in table 4, the result indicate that curriculum developers inspectors and resource teachers fully recommend all the practical subject activities presently being teught in primary schools.

5. Practical Subjects Periods

Curriculum developers, inspectors and resource teachers were asked to specify the number of periods which should be devoted to the teaching of practical subjects. Their recommendations are summarised in table 5 below.

TABLE 5

NUMBER OF PERIODS AS RECOMMENDED BY CURRICULUM DEVELOPERS, INSPECTORS AND RESOURCE TEACHERS

Periods	Respondents
One period	0
Two periods	2(5.0)
Three periods	21(52.5)
Four periods	5(12.5)
Five periods	8(20.0)

The data in table five indicate 52.5 respondents recommended three periods should be devoted to the teaching of practical subjects. These recommendations are largely in agreement with observed practice in primary schools. In fact the Education Reform Document 1977 recommends minimum of two periods from grades one to four and minimum of three periods from grade fives to seven.

6. Teachers activities which should be evident in practical subjects programme

Curriculum developers, inspectors and resource teachers were asked to rate the importance of teachers' activities in practical subjects which are indicated in the practical subjects programme. The results are shown in the table below.

TABLE 6

CURRICULUM DEVELOPER, INSPECTORS AND RESOURCE TEACHERS RATING PRACTICAL SUBJECTS PRESENTATION

	No. 40				
Presentation	High degree %	Some extent %	Very little %	None %	Does not apply
Lecture	5.0	15.0	10.0	0	7.5
Demonstrate basic instruction to entire class	60.0	15.0	2.5	0	0
Demonstrate to samll groups	75.0	10.0	2.5	0	0
Give individual advice when needed	67.5	17.5	5.0	0	0
Construct and give test	15.0	20.0	12.5	0	7.5
Arrange pupils for presentation	55.0	17.5	2.5	0	0

Observes esthetical standard	55.0	22.5	0	0	2.5
Foster creativity	70	15	0	0	0

The data in table six illustrate that lecture method in practical subjects was rated very low and therefore it was not recommended. The methods recommended were

- demonstrating to entire class 60%
- demonstrating to small groups 75%
- giving individual advice when needed 67%
- arrange pupils for presentation 55%
- observes esthetical standard 55%
- foster creativety 70%
-

These recommendations are largely in agreement with observed practice in primary schools, where many of these strategies are employed.

7. Practical Subjects Instructional materials

Curriculum developers, inspectors and resource teachers were asked to rate instructional materials for practical subjects in terms of organisation and usefulness. Data in table 7 illustratesthe the results below.

TABLE 7(a)

CURRICULUM DEVELOPERS, INSPECTORS AND RESOURCE TEACHERS RATING PRACTICAL SUBJECTS INSTRUCTIONAL MATERIALS

N= 40

Instructional materials	extremely useful and well organised %	very useful and well organised %	useful and organi %	poorly organised %	very poorly organised %
Practical subjects syllabus	20(50.0)	6(15.0)	(1 0)	0	0

Practical

Practical subjects Teachers' Handbook	47.5	30.0	12.5	0	0
Building craft	25.0	30.0	10.0	22.5	0
Basic Metal work	27.5	37.5	10.0	2.5	0
Some Basic practical skills	32.5	27.5	10.0	2.5	0

To determine which of the instructional materials for practical subjects are well organised and useful, the data in table 7 was condensed to two categories. All materials which were checked in as 'extremely useful and well organised ' or 'very useful and organised' or 'useful as recommended foriinclusion, while those which were checked in as 'poorly organised' or 'very poorly organised' were considered as rejected or not recommended. The results are shown below.

TALE 7(b)

RECOMMENDED INSTRUCTIONAL MATERIALS FOR PRACTICAL SUBJECTS

NO. 40

Instructional materials	Recommended %	Not recommended %
Practical subjects syllabus	85.0	0
Practical subjects Teachers' Handbook	80.0	0
Basic building craft	65.0	22.5
Basic Metal work	75.0	2.5
Some Basic practical skills	70.0	2.5

Table 7(b) shows that curriculum developers, inspectors and resource teachers instructional materials with the exception of basic building craft which is recommended by a small majority (5%

8. Organisation of practical subjects facilities

Curriculum developer, inspectors and resource teachers were asked to indicate their agreement or disagreement on the suggested ideas on the organisation of practical subjects facilities with the following statements in table 8 below.

TABLE 8

CURRICULUM DEVELOPER, INSPECTORS AND RESOURCE TEACHERS RATING THE ORGANISATION OF PRACTICAL SUBJECTS FACILITIES

N= 40

Statement	very much agree	agree	don't know	disagree	very much disagree
The site devoted to practical subject workshop building should be large enough to provide for future expansion	29(72.5)	4(10.0)	0	1(2.5)	0
Workshop should not utilize informal and junk materials	3(7.5)	2(5.0)	4(10.0)	10(250)	10(25.0)
Makeshifts are not supposed to be completed into workshops	5(12.5)	3(7.5)	6(15.0)	16(40.0)	2(5.0)

Workshops should be located so that the noise will not disturb other classroom theory activities	28(70.0)	3(7.5)	0	1(2.5)	1(2.5)
Worskshops should have sufficient space for different teaching and learning strategies	31(77.5)	4(10.0)	0	1(2.5)	0

(Percentages are given in brackets)

S N= 40

Statement	Very much agree	agree	don't know	disagree	very much disagree
Facilities for machine use in the workshop should not be restricted to students	11(27.5)	4(10.0)	0(0)	11(27.5)	8(20.0)
Children in Primary schools should be allowed to use machines	4(10.0)	6(15.0)	3(7.5)	12(30.0)	8(20.0)
Standard wooework and metal work benches lockers, and shelves are useful in a primary school workshop	27(67.5)	2(5.0)	0(0)	2(5.0)	3(7.5)

Storage facilities are of little value in a workshop	2(5.0)	2(5.0)	2(5.0)	11(27.5)	15(37.5)
Workshops should have sufficient space for visual dsplay	23(57.5)	8(20.0)	0(0)	1(2.5)	1(2.5)

(Percentages are given in brackets)

To determine which of these suggestions on the organisation of practical subjects facilities are recommended, the data in table 8 was condensed by adding up the percentage for agreeing as having been recommended for inclusion while those which are checked in as disagree or very much disagree were considered as rejected or not recommended. The data illustrate that the respondent 72.5% and 10% recommended that the workshop site should be large 50% recommended the use of junk materials; Makeshift were not recommended to be completed into workshops (45%); 70%, recommended the appropriate location of the workshops so that the workshop noise should not disturb classroom activities; 77.5% suggested that workshops should have sufficient space for different learning/teaching strategies.

On the use of machines respondents did not recommend the use of machines in the workshop 37.5% and 47.5%; children in primary schools should never be allowed to use power driven machines. The respondents recommended standard workbenches both for metal work and woodwork. (67.5%) Storage facilities were recommended by 65% and space for visual display was equally recommended (75.5%).

9. Material Conditions in the Schools

Curriculum developers, inspectors and resource teachers were asked to indicate the availability of practical subjects materials in the schools. The data in table 9 below illustrate the availability of materials in schools

CURRICULUM DEVELOPERS, INSPECTORS AND RESOURCE TEACHERS RATING THE AVAILABILITY OF PRACTICAL SUBJECTS MATERIALS

TABLE 9

N= 40

Materials	Abundatly available	Easily avalable	Available	Limitedly avalable	not available
Building craft materials	7(17.5)	2(5.0)	5(12.5)	7(17.5)	8(20.0)
Lightcraft materials	11(27.5)	6(15.0	6(15.0)	1(2.5)	3(7.5)
Metalwork materials	7(17.5)	3(7.5)	11(27.5)	6(15.0)	9(22.5)
Repair and maintenance materials	7(17.5)	5(12.5)	4(10.0)	6(15.0)	10(25.0)
Woorwork materials	12(30.0)	2(5.0)	7(17.5)	1(2.5)	4(10.0)

(Percentages are given in brackets)

To determine which of these materials are available in the schools, the data in table 9(a) was condensed to three response categories. All materials which were checked in as 'abundantly available' or 'easily available' or 'available' were considered as available for inclusion, while those which were checked in as, 'not available' and limitedly available were considered in the other two categories. The results are shown in table 9(b).

TABLE 9(b)

AVAILABILITY OF PRACTICAL SUBJECTS MATERIALS

N= 40

Materials	available	Limitedly available	not Available
Building 1 craft materials	14(35.0)	7(17.5)	8(20.0)
Lightcraft materials	23(57.5)	1(2.5)	3(7.5)
Metalwork materials	21(52.5)	6(15.0)	9(22.5)
Repair and maintenance materilas	16(40.0)	6(15.0)	10(25.)
woodwork materials	21(52.5)	1(2.5)	4(10.0)

(Percentages are given in brackets)

The results indicate that curriculum developers, inspectors and resource teachers illustrate that the materials for practical subjects are not very much available with exception of material for lightcrafts (57.5%) metal work (52.5%) woodwork (52.5%) by only a small majority in all.

OBSERVATIONS AND INTERVIEWS ON IMPLEMENTATION OF PRACTICAL SUBJECTS

Tools and equipment distributions

The Practical Subjects Project at Curriculum Development Centre (C.D.C.) in Cthe Ministry of Higher Education, sponsored by the Republic of Finland is the sole source and supplier of tool sets and cabinets to all primary schools in Zambia. Until 198 that the Ministry of General Education and Culture started allocating some funds in purchasing tools, benches and construction workshops. To ensure the practical subjects a success the Republic of Finland has spent

K937,000 on practical subjects equipment, tools and cabinets. This expenditure is for the years 1974 to 1981. It has further to spend K1,617.00 between the years 1982 and 1984. In addition to fince assistance the Finnish Government has been sending seven practical subjects pecialists on two year contract sine 1977. These officers come to Zambia to assist in organising and teaching of practical subjects. The projects has supplied tool sets to the following regions.

1. All primary teachers' colleges (1976)
2. Primary schools in Kabwe Region (1976)
3. Primary schools in the Copperbelt Region (1979)
4. Primary schools in Lusaka Region (1979)
5. Primary schools in Southern Region (1980)
6. Primary schools in Eastern Region (1981)
7. Primary schools in Luapula Region (1981)
8. Primary schools in North-Western Region (1981)
9. Primary schools in Northern Region (1982)
10. Primary schools in Western Region (1983)

Table 9 below shows the data fool, sets, cabinets and instructional materials distribution to all regions by the C.D.C. practical subjects project.

TABLE 19

DISTRIBUTION OF TOOLS, CABINETS AND INSTRUCTION MATERIALS

REGION	TOOL SETS	CABINETS	SYLLABUSES	HAND BOOKS
CENTRAL REGION	689(boxes)	0	300	300
LUSAKA REGION	135	135	130	130
COPPERBELT "	221	221	57(Kalulu-shi & Ndola	57
EASTERN "	433	433	-	-
NORTHERN "	490	490	500	500
LUAPULA "	240	240	100	100
NORTH-WESTERN	191	191	191	191
WESTERN REGION	-	-	-	-
SOUTHERN "	444	444	450	450

The data in table 9 illustrate some irregularities in the distribution of tool sets, cabinets and instructional materials. This is because of transport problems to collect the equipment and on the other hand it is the negative attitude by the regional officicals to ensure that they collect the instructional media from C.D.C. Lusaka. In the case of Western region tool and equipment distribution will take place in 1983.

Workshop facilities

Worshop facilities pose a challenging problem in primary schools. At the moment there are no workshops in primary schools except those which are in practising schools for college students (five primary schools per each college). The financing of practising schools workshops is being undertaken by the Ministry of General Education and Culture, which allocated K1000 per each college. The Practical Subjects Project has supplied five working benches to each of the practising schbols. These workshops are being built by the Practical Subjects Department in each college on self-help basis.

Whilst the problem of workshop facilities is eminent, the primary school teachers, college lecturers and students expressed and brought up a number of issues concerning workshops in schools.

Almost all practical subjects teachers, college lecturers interviewed indicated that school buildings are essentially in inter-disciplinary exercise. An architectural response to an educational requirement. It is required to promote an environment of learning and experience. Technology, in the content of our discussions, is not just the acquirement of basic skills in woodwork, metalwork, or bricklaying etc but a means of initiating creativity, the power of analysis, and skill of application. Hence the workshops should be the nerve centre of educational activity. This is the concept with which we must commence. Accommodating large numbers of pupils for a full range of activities was a big problem involving considerations of space, facilities and equipment services, noise, cleanliness, storage and the construction of buildings and finishes. It was necessary to know the numbers of pupils and teachers involved, to estimate the degree of utilisation, to know what kind of education and training the pupils would have at entry and the terminal aims.

In as far as the teaching of practical subjects is concerned the schools should offer adequate workshop facilities so that Practical Skills are taught properly. Workshops should also offer proper

working facilities where innovative ideas are tested in teaching practical skills. Therefore, workshops equiped with adequate benches and storage facilities must be built in all schools.

Responding to question of who should be responsible for the construction of workshops in primary schools the teacher trainers expressed the concern that whilst the tasks of building workshops in schools is eminent as far as the practical subjects are concerned, it is also a problem for the Ministry of Education and Culture. The Ministry has no money for building Primary School worksbops. The lecturers recommended that temporary workshops, or shelters; should be built on self-help basis.

They suggested that shelter construction could not be a problem because

- the Practical Subjects syllabus includes 'Building Craft, where a qualified practical subjects teacher is expected to know how to teach brick or block making and basic building construction. In addition to the above idea they suggested
- that schools should ask charitable organisations for assistance to meet this demand. Where possible they should ask trades schools for help too. For known records in some parts of Zambia Trades Schools have assisted in many school building projects. The "Building Section" in the Ministry of Education and Culture can also assist in building workshops where you have prepared all the materials required for the construction. I am sure they are able to provide the personnel. Lastly, the P.T.A. and the community the school serves should also be involved in this exercise of building workshops:-

- To make the school a universally accepted and integrated part of of the community it is decided that future users themselves should play an active role in the construction of their buildings.

- In order to keep investments low and make maintenance possible, solutions have to be simple, with the use of local materials that are easily acquired and with introduction of improved methods and preservation techniques.

- To stimulate local economies, it is decided that the provision of employment for locally available man-power should be one of the basic considerations in the development of projects.

- In order to provide the community with valuable buildings, constructions should be solid and provide for flexibility.

The construction plans have to be developed by the school construction unit of the Ministry of National Education taking into account their function and criteria of cost, durability and maintanance. Through the sue of locally available materials improved local building technicues and the involvement of the local population, solid and functional space could be obtained.

Preparation of practical subjects teachers

All teachers, college lecturers and students univocally stressed that practical subjects teachers in schools should be those who have had some experience in the teaching of practical subjects. This is very important because they should be capable of demonstrating modern methods of teaching practical skills and assistng pupils in the care and maintenance of tools and the workshop. The teachers should be resourceful who should use all possible materials the environment will provide. And pupils should be expected to learn and adopt this noble attitude.

After emphasising the key role to be played by the new type of teacher in innovation and reform, the particular attributes required by the teacher, in addition to the intrinsic qualities of character, personality and interest, they said were;

(i) a good standard of general education with a broad out look and an appreciation of the needs of society;

(ii) a level of expertise and skills appropriate to the subject areas in which it is desired to teach;

(iii) a sound knowledge of the art of pedagogy with all that it implies in the study of education and method.

The present situation is that, there are very few trained practical subjects teachers. And yet all primary schools should be offering practical skills. The following are some of the suggestions to solve the problem:-

(i) Specialist cources in practical subjects should be introduced in colleges in the same manner the Home Economics are training specialists.

(ii) Constant workshops and seminars be organised by C.D.C. in conjunction with the Ministry of Education Inspectorate, spread to all regions.

(iii) C.D.C. Practical Subjects Department shall be calling Pl Practical Subjects lecturers for the workshop on specific subjects e.g. woodwork or metalwork etc.

(iv) The lecturers shall go back to their colleges, where in collaboration with the Chief Education Officer will be conducting workshops for the resource teachers. The resources teachers for each region may be between 20 or 30 depending on the size of the region.

(v) The college lecturers shall be assisted by the C.D.C. staff and industrical Art teachers from Secondary Schools. The later should be arranged in advance by the Chief Education Officer.

The resource teachers shall be respondible for training other teachers in respective areas. The District Inspectors in their areas, [illegible] will be required to select suitable teachers who have interest and positive attitude.

(vi) It will be very important for District inspectors to attend all resource workshops so that they will be properly equiped with all ideas and skills to be mastered by the resource teachers.

(vii) In the districts practical subjects workshops shall be conducted in Secondary Schools which have workshop facilities. The Industrial Art teachers shall be requested to assist in this exercise. In fact they shall be responsible for the activities in the workshops to ensure that there is no messing up of equipment, tools and materials.

College as resourcecentre in implementing practical subjects

The primary school teachers trainee students in colleges interviewed expressed what should be in practice in as far as the teaching of practical subjects are concerned the college should function as resource centre. The practical subjects lecturers and the practical subjects teachers should be holding constant seminars and workshops where teaching materials will be made and how to teach them in practising schools. They should decide how often they will be meeting for these seminars. They will decide the mode of demonstration lessons and peer teaching.

They stressed that practical subjects teachers should always be invited to attend or observe demonstration lessons. There should be a provision in the College timetable where student teachers should be allocated to the practising schools for demonstration lessons. Since the college offers excellent facilities for demonstration lessons, teachers in practising schools should also be invited to conduct practical subjects lessons for student teachers to observe and learn how to conduct their own lessons.

On the organisation and administration of practical subjects in primary schools the primary schools teachers and trainee students said that teacher in-charge of practical subjects, appointed by the headmaster should be responsible for the tool sets and cabinets. He should keep a clear record of all the equipment and tools. They said in the invent of issuing or losing the tools, the schools should have two stock books, one for the head and the other one for the teacher in-charge. All tools should be entered in the stock books and signed by both officers. This will ensure smooth stock taking, handing over and avoiding unnecessary loses. Prices for individual tools is clearly shown in the government catelogue or contant hard ware firms which deals with tools and other equipment. Deliberate losses and damages through carelessness should be paid for by the people responsible. In the case of breakages through accidents, no charges should be made. The school should find some means in replacing the tools broken by accident. Teachers said some teachers will be borrowing some tools for personal use. This should be discouraged except where there is real need. In this case the teacher in-charge should keep a loan book indicating tools out or in from the cabinet and signed for. They also stressed the care and maintenance of tools as of prime importance. The tools and equipment in the workshop can be good servants if they are properly looked after. There is need for regular sharpening of tools. Saws should be set and sharpened. In the later, the practical subjects teachers should contact practical subjects department in the colleges, for the necessary assistance. They further stressed that tools and moving parts should be oiled or greased. Rulers squares, and other similar tools should be cleaned and tool handles should be inspected to see that they are not split and that tangs or heads are firmly attached to them. Tools and equipment being used should be placed tidily on benches. Tools not in use should be returned to the cabinets. Keep your working area clean.

Sources of Materials

One of the most serious problems affecting the teaching of practical subjects is the lack of practical subjects materials appropriate to the local needs. A general outlook at the information and data analysed and raised in this study reveals that the unsuccessful implementation of practical subjects largely stemmed from the shortage of practical subjects materials. However, all the respondents interviewed suggested that environment is categorised into physical and human resources. The environment is looked at as a systematic inter-action between the physical and human factors. They recommended that most environments are rich sources of different types of materials for practical subjects. Schools in urban areas have their own possibilities. Waste or scrap yards or even the local rubbish pit, can provide strange and exciting finds. Schools in rural areas are surrounded by environments with natural materials such as wood, bamboo, sisal, horns, hides, clay etc. What is needed is a positive and imaginative attitude on the part of the teacher which will fire the children to collect all sorts of materials.

Each school should improve the materials for practical subjects, since the project does not give any funds to buy materials nor does the Ministry of Education supply the necessary materials or equipment. This problem is being considered by high authorities. It is anticipated that in future the Ministry of Education will start giving funds for buying materials and equipment.

However, many different materials an environment may provide, it is likely that the teacher will need to provide supplementary materials. For example strings and wires of various gauges, perhaps plywood and off-cuts of timber, metal bars, and leather; which might be built up as permanent resources. The teachers has also to be imaginative in the range of tools and adhesives provided. Problems arise mostly from the need to join one materials to another rather than cutting or shapping, and these problems are usually without traditional ready-made solutions. This is an important aspect of the work and one which develops in children the capacity to improvise and to develop their own techniques rather than to rely on adult know-how. Adhensives need to be good mult-purpose glues of the contact types, capable of holding many types of materials together.

Although different materials will be provided by the environment, it is most likely that the teacher will need to provide supplementary materials such as nails screws, strings, wires, planks, off-cuts of wood, glue etc. To get the above materials, the schools should generate some funds in order to purchase them.

One way of generating funds is through the creation of Production Unit. Items made during the practical subjects activities should be sold in order to raise funds in which to buy the required materials and equipment. Production Unit is not confined to agricultural produce but also to the articles made in practical subjects which are functional and possess utility.

In utilizing human resources, the school should inco-operate traditional craftsmen who have acquired skills through informal apprenticeship. This must be encouraged to accommodate traditional crafts in our curriculum and some innovation must be sought to improve both the quality and quantity of their products. This idea will strategically develop the total human and material resources of the nation. This will also result into effective mobilisation of all available human resources for the ardous task of development.

CHAPTER FIVE

DISCUSSION AND RECOMMENDATIONS

In the preceding chapters an attempt has been made to scrutinize and identify the problems affecting the full implementations of practical subjecs in Zambia primary schools. There are many issues raised as related to objectives of this study through the eliciting made by cuestionnaires, interviews and observations. These instruments have helped the researcher to investigate and discover the problems and suggest solutions to them.

In chapter one a discussion has been made to show the imprtance of teaching practical subjects in primary schools. It is a well krow thing that an initiation to technology and to the world of work is an essential component of basic education, without which this education is incomplete.. It is through practical education that will lead to an understanding of the scientific and technological aspects of contemporary civilization in such a way that pupils comprehend their environment and capable of acting upon it, while a critical view of the social political and scientific and technological change.

There is apparent justification on the implementation of practical subjects judging from the way practical subjects are being taught in primary schools. If given the necessity for new relationships between education, working life and the community as a whole practical subjects education should exist as part of the system of life long education adapted to the needs of the country. This system is directed to the abolishing barriers between levels and employment and between school and society. It is also directed at improving the quality of life by permitting the individual to expand his intellectual horizons and to accuire constantly professional skills and knowledge while allowing society to utilize the fruits of economic and technological change for the geneal welfare.

The background of practical subjects situation in Zambia has been discussed at length. It has been seen that the country has just realised the imprtance of elementary technical subjects, usually offered in the first cycle fo the primary level. The teaching of practical subjects in colonial days were designed to introduce pupils

to the elements of technology; to develop basic practical skills and offer productive experience in the manipulation of tools and materials. It is in this thought that an attempt is being made to make practical subjects as guidance and as an exploratory rather than to prepare pupils for specific occupation. On the other hand, it is intended to acquaint all primary school pupils with the world of modern technology and in relation to contemporary life as a whole. On the other hand, it may serve to guide those with the interest and ability into technical and vocational education proper. Thus the implementation of practical subjects in Zambia primary schools serves to enlarge the basic education of all pupils; to orient some towards futher technical and vocational education and in addition to provide early school leavers with some rudiments of technological understanding which will enable them to be more easily trained on the job.

Chapters three and four concern themselves with the procedure, method and administration of the study. The development of questionnaire has helped to elicit, scrutinize and establish evidence about the problems of implementation of practical subjects. The data analysis revealed a lot of information about the teaching of practical subjects; training of practical subjects teachers, workshop facilities and supply of materials for practical subjects. The attitude of professional and administrative personnel in the Ministry of General Education and Culture, is positive towards the implementation of practical subjects.

PRACTICAL SUBJECTS TEACHERS

The problem of recruiting competent teachers for every area of practical subjects education is an especially difficult one for Zambia. Yet if the educational reforms, which introduce practical skills into the basic education are to be successfully implemented, the qualified teachers have to be found.

It is obviously difficult to determine the best source of teacher recruitment, as well as the appropriate qualifications if the general objectives and curriculum content are not defined. The choice of sources of recruitment and specific qualification are given below:-

1. Qualified academic teachers with the suitable background and aptitude should be retrained in the practical subjects.

2. Instructors from trades training institutes with suitable skills should receive futher general education where necessary together with professional training.

3. Students straight from secondary schools may be taken into colleges and given the necessary general education and technical training and pedagogy.

4. It is common to find people with home workshop who have developed to a very high degree their skills in cultural manual dexterity. This type of people, although perhaps not very industrially oriented may be useful to teach the use of hand tools, simple maintenance and repair work etc.

Each of these sources of recruitment have advantages and disadvantages an indeed some should be seen as measure of expediency rather than a permanent source of recruitment. For example, the second source of recruitment - instructors - has the disadvantage of providing candidates who may not be comfortable with the theoretical aspects of practical subjects education. On the other hand, a teacher with this background would be in the practical aspects. Recruiting students directly from secondary schools and preparing them in basic education programme of the same level as for other basic education teachers and designed especially for the purpose, would have the advantage of training people specifically for the career of practical subjects education and would perhaps ensure that the practical subjects teacher is thoroughly integrated with the rest of the basic education teachers.

It is agreed that practical subjects teachers should have certain qualifications in three areas, thus individual cualification, technical and pedagogical. These qualifications could be summed up in the following manner:

1. A broad understanding with a sound basic knowledge of the subject matter to be taught.

2. The ability to use common hand tools and machinery.

3. A sound pedagogical training directly related to practical subjects.

4. Good verbal ability and graphic skill,

5. Industrial experience would be preferable but not always essential. This would depend on the level and type of subject material in the curriculum and the level of class to be taught.

In acquiring these qualifications the teacher should ideally develop the ability to educate rather than simply to transfer knowledge. Two points should be made with regard to proper qualifications of practical subjects teachers. Obviously, a good practical subjects teacher as any teacher, should have an excellent command of the subject matter he is to teach. In the case of the practical subjects teacher the importance of pedagogical qualifications should be underlined; he should know the methodology of teaching practical subjects to young adolescents which recuires a different approach than as if one is teaching a specialized field to older adolescents or young adults. Secondly the practical subjects teacher should be able to teach both theoretical and practical aspects of metal work, woodwork, building craft and light crafts.

In Zambia, the practical subjects teacher has had lower status than that of the academic teacher. It is of great importance that the practical subjects teacher enjoys the same status as his colleagues in other fields. It is all the more imperative given one of the major goals of practical subjects to truly integrate the study of technical subjects with that of academic subjects in order to form a well-balanced basic education curriclum in primary schools. Only if the teacher of practical subjects is on strictly equal footing with his colleagues will this be accomplished.

THE PREPARATION OF PRACTICAL SUBJECTS TEACHERS

The patterns of professional training appropriate for practical subjects teachers as well as the content of this preparation will depend on two factors: the source of recruitment and the qualifications of prospective teachers at entrace to the teacher preparation programme.

Practical subject teacher preparation, as with that for all teachers, may follow several patterns: pre-service or in-service, full time or part-time. If practical subjects teachers are recruited from those who are already qualified teachers in another field, then some form of part-time or in-service training would be appropriate. In this way they may continue in employment as teachers of other fields until such time as they are fully prepared to teach general technical subjects. If teachers are to be recruited from among technicans or workers employed in industry, then some form of part-time training would be equally appropriate. Yet, as the experience of several countries shows, this source of recruitment has proved a very limited one given the disparity metioned above in salaries in comparison with the teaching profession.

A lengthy (2 to 3 years) programme of preparation is suitable and necessary where students are recruited directly from secondary schools. This type of programme and recruitment has certain advantages. Students will be prepared specifically for a career as a practical subjects teacher and thus the risk of losing them to employment outside the teaching profession is more limited. Yet another advantage is the fact that with this type of programme the preparation of practical subjects, teachers will more closely resemble that of teachers of other subjects in general schools. With similar qualifications and requirements general technical teachers and the subjects they teach will be more easily accepted as a valid and necessary part of general education programmes.

The type of institution in which practical subjects teachers should be prepared poses yet another question for those responsible for organizing appropriate training programmes. Practical subjects teachers might be prepared in one of three types of institution: a special institution, an institution which trains general subjects teachers for the schools, or institutions which train technical and vocational teachers. Each type of institution has special advantages. A separate institution could better focus the programme on the special needs of future general technical teachers. To train practical subjects teachers in a general teacher training institution with core courses for all would have the advantage of

integrating from the very start of their professional careers all teachers in the secondary schools. And evidently, technical and vocational teacher training institutions would be better equipped to give future practical subjects teachers a thorough grounding in the various technical fields. The decision as to the type of institution most appropriate for the preparation of practical subjects teachers would be mainly based on two factors: the facilities available and the general technical education objectives emphasized in a given country. Where, for example, general technical education is geared to providing as many young people as possible with skills which will render them more easily employable, the technical and vocational teacher training institution might be the most appropriate type.

In the choice of the type of institution or training pattern to be used for the preparation of general technical teachers, developing countries are forced to take into consideration their immediate and urgent needs. Thus on the whole, during the near future, programmes should be kept to a minimum length of time consistent with the desired and expected results from general technical education.

The actual content of a practical subjects teacher preparation programme will, of course, depend upon the qualifications of future teachers at entrance into the programme. All programmes for practical subjects teachers should offer three broad areas of study: general studies, technical subjects, and pedagogical studies. These areas will be more or less emphasized according to the previous training of the students. For example, someone with technical qualifications would follow a programme which would include a heavier load of courses in theoretical and applied pedagogy. The largest part of a programme for those already teaching another field and therefore already possessing and special methods for teaching them.

The improtance of the practical technical training in practical subjects teacher preparations programmes and of special teaching methods were especially noted. Every effort should be made to ensure that future teachers are not required to engage in practical exercises with outmoded and useless objects. On the contrary, teacher training

institutions should take the lead in keeping up with the latest technological developments so that workshop exercises taught in the schools remain up-to-date. With regard to the second element special teaching methods - general technical teachers should have a thorough grasp of the methods most appropriate for teaching their fields. This area is most important if practical subjects education is to fulfill its purposes as an integral part of general education. It must be taught with new approaches and special methods, as the methods used in traditional craft or practical works courses, or even in technical education will not suffice.

A further point should be made concerning the importance of in-service courses as means for general technical teachers to periodically and consistently update and up-grade their knowledge of technical fields in terms of new teaching methods. All teachers should be highly encouraged to follow such courses, and these courses should be organized in such a way as to make them as easily available as possible.

WORKSHOP

School workshops are essential in order to implement practical subjects. In order to be directly operational and respond to existing needs the first buildings are being constructed following the already approved plans with minor modifications and selected existing construction methods; methods that could be easily be understood by local construction officers. At the opening of new construction sites improvements are introduced after careful evaluation of experiences (conceptional, technical and logistical) gained in earlier constructions and by introducing selected new materials and methods.

In the construction of workshops only cement and reinforcement steel are brought in from the exterior, while doors and windows (wooden shutters) are manufactured inworkshops within the provinces. However, the waiting times for these elements, especially the woodwork made to measurement and after completion of masonry work, were very long. While little could be done to improve the cement supply, other than reducing dependability on it, the door and window problem could be solved by the introduction of pre-fabricated standard elements. These elements can be produced in small provincial

industrial workshops, and delivered to the building site before masonry work is started.

It further becomes apparent that each time, while resorting to local available resources for a general construction programme we have to take into account all the secondary effects that such request might have on the environmental and on other sectors of development. While the use of local materials had a good effect on building costs and reduced the problem of transport, it was found that in order to burn bricks and tiles a large quantity of trees are being cut down, and that in regions where reforestation projects are being launched. While this consumption of trees may be of no consequence in the case of simple isolated projects, it may become dangerous when made a general practice. Plans were therefore modified to reduce the utilisation of burned bricks (replacement of burned bricks by stone or pressed sun-dried building blocs).

While most communities are well prepared to start building activities and to allow proper guidance, and in fact advanced at certain stages faster than was expected, other communities do not meet with projected targets. As such technical assistance is difficult to plan. In order to improve aspects, it is for instance proposed that missions to assist in works such as the staking out of buildings, should not be effected before the community had all the materials and tools ready to dig and construct the foundations. Where these conditions are not met repeated visit are required to carry out the same work again.

At times the technical team arrives on sites where materials had already been selected, and this is not according to plan. In such a situation only a minimum of materials and construction works are rejected to reduce losses (supervision here differs from that required from buildings constructed under contract). Small variations in the standard plans, such as on door and window details, the execution of the ring beam, trusses and roofing are permitted. The team however takes action where safety conditions dictated such, or where functionality and comfort are effected.

Various improvements in the plans to be transmitted to interested communities are introduced for the execution of new workshops in the second phase of the project. Changes are made in order to allow for greater flexibility, to simplify execution, to reduce the utilisation of blocks or burnt bricks, to reduce the span covered by the trusses (7 m instead of 8 m), to improve natural lighting levels, and to reduce the need for doors and windows. In order to avoid an excessive use of cement strict limitations is imposed. (From the start of the project buildings are intended to be constructed with mud mortar, and cement pointed joints, this practice has not generally been respected). All changes introduced for the second phase resulted in simplifications and a reduction of costs.

The present plans are to be considered as a second phase on the way to achieve self-sufficiency in the creation of buildings. The continuing study of and search possibilities for the introduction and implementation of improvements,, remains a matter of general policy and interest.

The construction plans have been developed by the school-construction unit of the Ministry of General Education and Culture taking into account their function and criteria of cost, durability and maintenance. Through the use of locally availabke materials, improved local building technics and the involvement of the local population, solid and functional space could be obtained. The buildings thus erected can be maintained without further outs involvement.

RECOMMENDATIONS

The study upholds the hypothesis on which it was based, namely that the implementation of practical subjects in Zambia primary schools is not as effective as it ought to be in giving the pupil the required basic practical skills, and to offer productive experience in the manipulation of tools and materials, because of the absence of a systematic curriculum that has been professionally developed. It is the writers hope that the findings of this study will prompt further investigations which will eventually enable the National Curriculum Development Centre design and develop a more comprehensive and systematic implementation of practical subjects in primary schools. The following are the recommendation for effective implementation of practical subject

1. Facilities for practical subjects in Primary Schools should be made through;

i) Self-help Projects by the School unit as well as the Parent Teacher Association.

ii) Party Officials and other influential people in the community should build temporary shelters to be used as workshops

iii) Where possible the Ministry of Education and Culture building section should assist in building these workshops.

iv) Teachers should be encouraged to make benches and forms for use at their schools.

v) Storage rooms should be built for safe keeping of tools and materials.

vi) Schools with empty rooms should be converted into workshops.

vii) Teachers should be encouraged to use local materials when teaching practical subjects.

viii) Safety regulations should be observed when teaching practical subjects.

Above all, in principle there should be workshops at every Upper Primary School, but when the Government has money available such workshops should be built at very Upper Primary School where such buildings do not exist.

2. Preparation of Practical subjects Teachers.

i) It is necessary that the curriculum for Teacher Training College should involve C.D.C. Staff, College Lecturers and any other competent personnel available to serve on the existing Practical subjects Committee.

ii) The practical subject course should take two years because it carries more practical work.

iii) Teachers who should specialise in the teaching of practical subjects should be those with G.C.E. Certificates and above.

iv) There should be an International College in the country for Practical subjects courses.

v) C.D.C. Practical subjects Department should conduct resource workshops for College lecturers, Inspectors, and Education Officers.

vi) In districts practical subjects workshops should be conducted in secondary schools which have workshops facilities.

vii) Those who go to specialise in the teaching of practical subjects should not mix with those teaching academic courses.

viii) The attitude should be acceptable to those who go for training as practical subjects teachers.

ix) Those that had been trained at NISTCOL (Chalimbana) should be retrieved from the classroom teaching and redirected to practical subjects teaching.

x) When such teachers, eventually, show a considerable talent in the Practical subjects teaching skills should be sent for furtner upgrading course to specialise in practical subjects as an incentive.

xi) Those that have undergone a practical subjects course during their pre-service training ever since this course was introduced should be fished out from the general academic teaching and be posted according to needs in schools.

xii) The former junior trades instructors who have not been promoted to responsible posts should be rediscovered and be reoriented so as to be used as

a) Specialists in schools
b) Seminars and workshops resource personnel

xiii) Where Trades Institutions exist they should send their second year students to local Primary Schools to work with teachers and pupils.

xiv) Intensive and extensive workshops and seminars should be mounted for Inspectors and District Education Officers with their team so that they are able to handle tools competently.

xv) In order to achieve the required objectives it is imperative that reliable and adecuate transport facilities be made available.

3. Sources of materials.

i) Teachers and pupils should make use of local materials such as wood, bamboo, sisal, oil tins, scrap materials etc and should be of a positive and imaginative attitude.

ii) Teachers and pupils should not take articles produced from local materials to be inferior.

iii) There should be proper use of humah resources by asking local men or women with certain skills to assist in the teaching of practical subjects in schools.

iv) Funds should be generated by selling finished articles.

v) The community should participate in donating some local materials.

vi) Schools should try to exchange materials found in their localities.

vii) The Party and its Government should start buying materials to be used in teaching practical skills in all areas of practical subjects.

ANNEX 1

CURRICULUM DEVELOPERS, INSPECTORS AND RESOURCE TEACHERS

QUESTIONNAIRE

Please kindly answer all questions in the questionnair without writing your name.

1. Which of the following subjects area conveys the true meaning of Practical subjects (wood work, metal work, building Draft and light crafts) in Primary Schools.

(i) creative activities	
(ii) art and crafts	
(iii) industrial arts	
(iv) handicrafts	
(v) technical crafts	
(vi) homecrafts	
(vii) Fine Arts	

2. The following is a list of suggested teachers for implementing practical subjects. Indicate your agreement or disagreement with statements according to your own opinion.

Statement	very much agree	agree	don't know	disagree	very much disagree
(i) Practical subjects in Primary Schools need specialist teachers					
(ii) Teachers with basic practical skills should be made to be in charge of practical subjects					

STATEMENT	Very much agree	agree	don't know	Disagree	Very much disagree
(iii) Only the tradesmen should be employed to teach practical subjects in Primary Schools					
(iv) The industrial art skills belong only to the secondary school teachers					
(v) The Primary School practical subjects teacher should be capable of demonstrating industrial skills					
(vi) Practical subjects teachers should be maintenance teachers					
(vii) Only the industrial art teachers should be allowed to teach practical subjects in primary schools					
(viii) The practical subjects teacher should not teach any other subject apart from practical subjects					

(ix) Village tradititional craftmen should be involved in teaching practical subjects in Primary Schools				
(x) Any Primary School teacher can teach practical skills				
(xi) The headteacher should be the only officer to be in charge of practical subjects				
(xii) Practical subjects is the only subject without any general contribution to the School Community				
(xiv) Traditional craftsmen do not know the techniques of practical subjects				

2. Suggest any other teacher competence which you feel should be added to or should replace the ones above.

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4. Indicate the relevance of the following content areas of practicals subjects curriculu.

Learning activities	Extremely useful	very useful	useful	Uncertain	not useful
(i) Bamboo work					
(ii) Bonework					
(iii) Brushwork					
(iv) Building craft					
(v) Hornwork					
(vi) leatherwork					
(vii) metalwork					
(viii) Repair and Maintenance					
(ix) Sculpture					
(x) Woodwork					

5. Mention any other activities not covered in number 4 which you consider to be of interest in the teaching of practical subjects.

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6. Specify the number of periods which should be devoted to the teaching of practical subjects by inserting x in appropriate box.

(i) One period	
(ii) two periods	
(iii) three periods	
(iv) four periods	
(v) five periods	

7. Listed are some of the teacher's activities that should be evident in the practical subjects programme. Indicate their degree of importance

Presentation	High degree	Some extent	Very little	None	Does not apply
(i) Lecture					
(ii) Demonstrate basic instruction to entire class					
(iii) Demonstrate to samll groups					
(iv) Give individual help when needed					
(v) Construct and give test					

(vi) Arrange pupils for presentation					
(vii) Observes esthetical standard					
(ix) Foster creativity					

8. How would you rate the following practical subjects instructional materials in terms of their organisation and usefulness as curriculum materials

Instructional material	extremely useful and well organised	very useful and well organised	useful and well organised	poorly organised	very poorly organised
(i) Practical subjects syllabus					
(ii) Practical subjects teachers' Handbook					
(iii) Building craft					
(iv) Basic Metal work					
(v) Some Basic practical skills					

9. Please comment here on any other significant instructional materials for practical subjects which has not been covered. Any other personal observations are also very well come

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10. Listed are some of the ideas on the organisation of practical subjects facilities study each statement carefully and indicate your agreement or disagreement according to your opinion

Statement	very much agree	agree	don't know	disagree	very much disagree
(i) The site devoted to practical subject workshop building should be large enough to provide for future expansion					
(ii) Workshop should not utilize informal and junk materials					
(iii) Makeshifts are not supposed to be completed into workshops					
(iv) Workshops should be located so that the noise will not disturb other classroom theory activities					
(v) Workshops should have sufficient space for different teaching and learning strategies					

Statement	very much agree	agree	don't know	disagree	very much disagree
(vi) Facilities for machine use in the workshop should not be restricted to students					
(vii) Children in Primary Schools should be allowed to use machines					
(viii) Standard woodwork and metal work benches lockers, and shelves are useful in a primary school work-shop					
(ix) Storage facilities are of little value in a workshop					
(x) Work-shops should have sufficient space for visual display					

11. Please comment on any other significant aspect of work organisation not mentioned in No. 10.

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12. Listed are some of the materials that should be provided in practical subjects programme. Please indicate the availability of these materials in schools

Materials	Abundantly available	Easily available	Available	limitedly available	not available
Building craft materials					
Lightcraft materials					
Metalwork materials					
Repair and maintenance materials					
Woodwork materials					

13. Considerning the wide rage of practical subjects skills to be taught in primary schools, suggest below, methods of accuring and supplying materials in schools

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ANNEX 2

OBSERVATION GUIDE FOR

PRIMARY SCHOOL

The observation guide will focus ontthe following factors:-

(i) Availability of workshop facilities e.g. workshop building building benches, storage rooms.

(ii) Availability of tools, materials and other equipment.

(iii) Plupils activities both in the workshop and outside the workshop e.g. production unit.

(iv) Workshop organisation and management e.g. project work, individual work or group work.

(v) School time table.

(vi) Provision of safety precautions.

vii) Teacher functioning i,e. teacher inter-action with pupils.

Observation guide for Colleges.

1. To examine Practical Subjects time table.
2. To examine the course content of the syllabus.
3. Observe workshop organisation and management,
4. Observe students activities in the workshop.
5. Observe Workshop facilities such as the workshop building benches, space, light, safety, visual display, storage rooms, lecturers tutorial rooms.
6. To examine production units.
7. Observe teaching practice organisation and management.
8. Lecturer functioning i.e. how lecturer interacts with students and his resource fulness in creating learning situations.

INTERVIEW SCHEDULE FOR COLLEGE LECTURERS

1. What do you need mostly in preparing student teachers in practical subjects?
2. What do you consider to be the most important thing student teachers should master in teaching practical skills

3. What is your views on practical subjects teachers preparation?
4. What is staffing situation in your department.
5. What are the main areas of practical subjects syllabus do you cover in each course?
6. What aspects of training do you lay most emphasis?
7. Do you run any in-service courses in this college?
8. Have you ever had female students in practical subjects.
9. Do you have any machinery of following up the performance of your students once they leave your college.
10. What is the minimum academic level required for your students in the college?
11. Do students come to the college with some industrial arts experiences learnt in secondary school?
12. How do you assess their suitability to teach practical skills.

INTERVIEW SCHEDULE FOR

PRIMARY SCHOOL TEACHERS

1. What facilities do you have in teaching practical subjects?
2. What do you consider to be the most important things childred should learn in practical subjects?
3. Do you utilize traditional handicraft in teaching practical subjects?
4. Do you find the teachers handbook and the syllabus for practical subjects useful?
5. Have you ever attended an in-service course in practical subjects?
6. How do you get your materials for practical subjects e.g. metal and wood work materials etc.
7. How many children do you have per class?
8. Have you involved children in any practical subjects production unit?

INTERVIEW SCHEDULE FOR

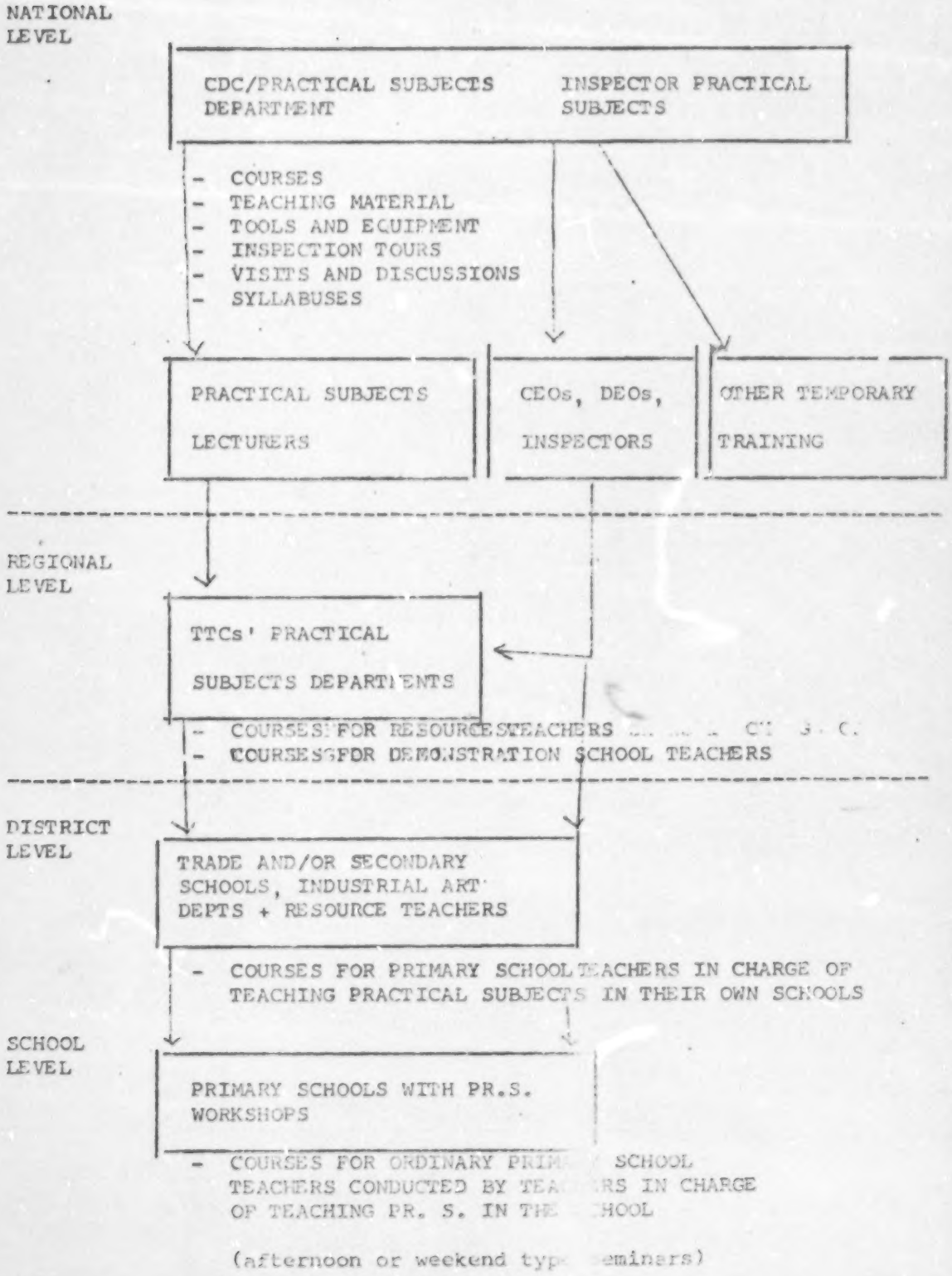
THE STUDENTS IN THE COLLEGE

1. What is the main objectived for learning how to teach practical subjects.
2. What are the main areas of practical subjects you are taught?
3. Are you happy with the way practical subjects organised in the college time table?
4. Do you have teaching practical facilities in the college and 1 outside the college.
5. Are you happy with the way you interact with your lecturers during practical work.
6. Is there any integration between practical subjects and other primary school subjects.
7. How often are you involved in production units.

ANNEX 3

PLAN FOR AN IN-SERVICE TRAINING

SYSTEM IN PRACTICAL SUBJECTS


NATIONAL LEVEL
CDC/PRACTICAL SUBJECTS DEPARTMENT
INSPECTOR PRACTICAL SUBJECTS
- COURSES
- TEACHING MATERIAL
- TOOLS AND EQUIPMENT
- INSPECTION TOURS
- VISITS AND DISCUSSIONS
- SYLLABUSES
PRACTICAL SUBJECTS LECTURERS
CEOs, DEOs, INSPECTORS
OTHER TEMPORARY TRAINING
REGIONAL LEVEL
TTCs' PRACTICAL SUBJECTS DEPARTMENTS
- COURSES FOR RESOURCE TEACHERS
- COURSES FOR DEMONSTRATION SCHOOL TEACHERS
DISTRICT LEVEL
TRADE AND/OR SECONDARY SCHOOLS, INDUSTRIAL ART DEPTS + RESOURCE TEACHERS
- COURSES FOR PRIMARY SCHOOL TEACHERS IN CHARGE OF TEACHING PRACTICAL SUBJECTS IN THEIR OWN SCHOOLS
SCHOOL LEVEL
PRIMARY SCHOOLS WITH PR.S. WORKSHOPS
- COURSES FOR ORDINARY PRIMARY SCHOOL TEACHERS CONDUCTED BY TEACHERS IN CHARGE OF TEACHING PR. S. IN THE SCHOOL
(afternoon or weekend type seminars)

ANNEX. 4

CURRICULUM DEVELOPMENT CENTRE

PRACTICAL SUBJECTS

LIST OF TOOLS GIVEN TO EACH SCHOOL

2 hand saws 24"

6 tenon saws 350 mm

4 hacksaws
+ extra blades

3 bit braces STANLEY 10"

+ 2 bits IRWIN 6 mm

2 " 13 mm

2 " 25 mm

3 handrills STANLEY

+ 2 drills 6 mm

2 " 4 mm

2 " 3 mm

3 claw hammers

2 ball pen hammers

4 iron smoothing planes STANLEY

2 spokeshavers STANLEY

4 knives

1 utility knife STANLEY

4 screwdrivers 8 mm 5,5 mm 4 mm 3.5 mm

5 clamps

6 firmer chisels

2 grooved chisels (gouges)

2 adjustable spanners

- 150 mm
- 250 mm

3 tape rules 2 m

3 rules, stainless 30 cm

3 trysquares /200 mm

3 combination pliers

- 165 mm
- 185 mm
- 205 mm

3 tinsnips

2 revolving punchpliers

2 axes

4 files

- 2 x halfround bastard 8"
- 2 x round bastard 8"

2 halfround wood rasps bastard 8"

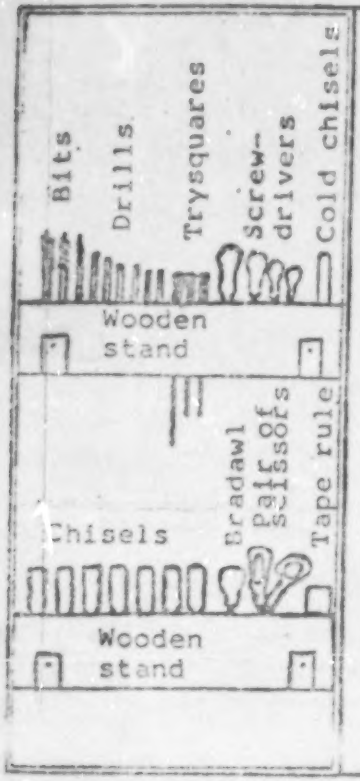
2 flat chisels 200 m

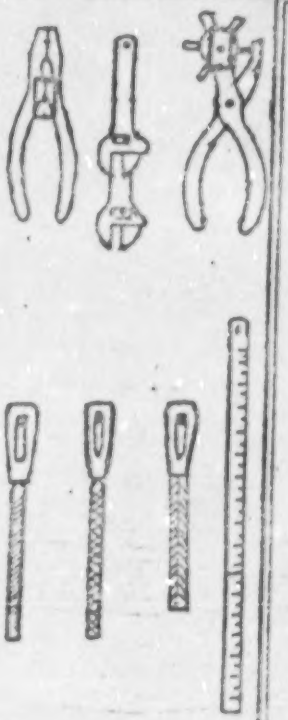
2 sharpening stones

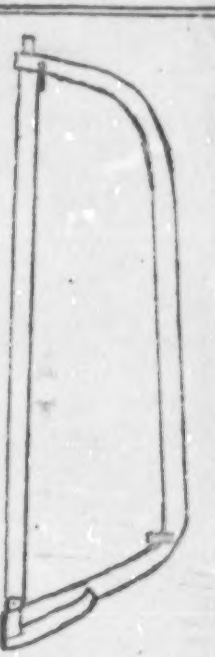
ANNEX 5

DIAGRAM ON PLACING TOOLS IN THE CABINET

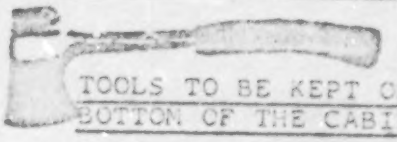
Left side door | Left side wall | Back side wall | Right side wall | Right side door







1. PLACE THE TOOLS ACCORDING TO INSTRUCTIONS USING THE HOOKS ON THE WALLS
2. MARK THE CORRECT PLACE USING THE RED CONTACT PLASTIC
3. ALWAYS PLACE TOOLS, AFTER USE, TO THEIR CORRECT PLACES TO AVOID LOSES AND TO AVOID TOOLS TO BECOME BLUNT



TOOLS TO BE KEPT ON THE BOTTOM OF THE CABINET:

- planes
- axes
- oilgan
- grinding machine
- sharpening stone
- marking gauge
- spare blades
- soldering wire

... PLACE WASTE PIECE OF CARTON OR EQUIVALENT UNDER THE PLANE TO AVOID THEM TO BECOME BLUNT

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